Portfolios as a tool for AfL and student motivation

Portfolios as a tool for AfL and student motivation: are they related?

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The power of portfolios in enhancing student motivation is frequently emphasized. Portfolios are conceptualized as a tool to implement Assessment for Learning (AfL) in classroom practice. However, the relation between portfolios and AfL on the one hand, and student motivation on the other hand, is complex and subject to many assumptions. This study investigates whether portfolio use actually supports the integration of AfL in classroom practice and the relation with students' motivation. Questionnaires were administered to a total of 419 grade 4 to 6 students from seven Dutch elementary schools. The results of structural equation modelling did not confirm a direct relation between portfolio use and students' motivational orientation. The findings indicate that the relation between portfolios and motivational orientation is fully mediated by students' perceptions of AfL. The findings indicate that the tool portfolio is not related to students' motivation, however, AfL practices do affect motivation.

Keywords: assessment for learning; portfolio assessment; motivation; elementary education

Introduction

Assessment for Learning (AfL) is deeply interwoven with teaching and learning processes and is intended to increase students' agency in their own learning process by equipping them with the habits and skills to learn independently. This is in line with the concept of self-regulated learning (SRL), which central focus is to engage students cognitively, metacognitively and motivationally as active agents in their learning process. For this reason, over the last decades attention for the relationship between Assessment for Learning (AfL) and various aspects of SRL has increased strongly (Andrade & Brookhart, 2016; Heritage, 2018; Panadero, Andrade, & Brookhart, 2018). However, while ever more researchers see value in fusing the concepts of AfL and SRL, there remain gaps in the available research.

First, most studies on the relationship between these concepts focus on the cognitive or metacognitive component of SRL. Remarkably, the relationship between AfL and the motivational component of SRL remains underemphasized in the available

literature, despite the fact that scholars in the field of SRL have indicated that students' use of SRL strategies is not only a matter of skill, but also of motivation (e.g. Andrade & Brookhart, 2016; Pintrich, 1999; Zimmerman & Moylan, 2009).

Second, a long-held belief by researchers in the field of self-regulated learning was that elementary school students are unable to self-regulate their learning (Schunk, 2001). While this idea has been countered by studies that demonstrates that elementary school students do actually engage in various SRL activities (e.g. Perry & Vandekamp, 2000; Whitebread et al., 2009), there is still a lack of empirical research on SRL in young children. Research that extends our understanding of how assessment practices such as AfL can promote the development of SRL in elementary school students is even more scarce (Whitebread et al., 2009).

Third, research on AfL has identified various strategies and tools that can be used to embed AfL in the curriculum. One of those tools is a portfolio, a portfolio is a meaningful collection of student work in one or more areas that gives detailed evidence of a student's effort and achievement over a period of time (Paulson, Paulson & Meyer, 1991). Portfolio assessment requires students to reflect on their work, identify strengths and weaknesses and determine next steps in their learning. Evaluating work in light of previous achievements and coming to understand how learning can be improved as crucial elements of portfolios as a tool to support AfL, are argued to enhance SRL and more specifically students' motivation (Black, Harrison, Lee, Marshall & Wiliam, 2004; Gencel, 2017). Despite the many claims about the beneficial impact of portfolio use, the relationship between portfolios as a tool to support the integration of AfL in the curriculum on the one hand and student motivation on the other hand, is complex and subject to many assumptions. Moreover, research often denies the complexity of

educational practice to a small number of variables that can be easily controlled in a research setting, resulting in conclusions that are hard to replicate.

The aim of this study is to address the above mentioned gaps on the relationship between AfL and SRL. In particular, this study investigates whether portfolio use in elementary education actually supports the integration of AfL in classroom practice and whether it promotes students' motivation. Below we discuss in more detail the concept of AfL, the use of portfolios as a tool for AfL and its relation with students' motivational orientation from a Self-Determination Theory perspective.

Characteristics of Afl

The concept of AfL was introduced to emphasize the notion that assessment needs to be an integrated part of the curriculum (Birenbaum et al., 2006; Black and Wiliam, 1998a; Stiggins, 2005). The central place assessment takes in the instructional system is voiced by Wiliam (2011, 3): 'It is only through assessment that we can find out whether a particular sequence of instructional activities has resulted in the intended learning outcomes'. AfL is characterized as a process of continuously collecting and interpreting information about student learning in order to tailor instructional and learning activities to better fit students' needs (Black & Wiliam, 1998a; Wiliam, 2011). It supports students to become active agents in their learning by thinking about how to plan their work, monitor their work by generating feedback on work, reflecting on strengths and weaknesses and determining how work in progress can be improved. As such, AfL shows conceptual similarities with SRL (Andrade & Brookhart, 2016).

Key elements in AfL are monitoring students' progress by accurately describing where they are in their learning and providing scaffolds that give information on where they are going and what steps need to be taken in order to get there (Black & Wiliam, 2009; Pat-El, Segers, Tillema & Vedder, 2013; Wiliam, 2017). AfL is conceived as

being central to classroom practice, thereby reflecting the close relation between teacher and student in the assessment process (Klenowski, 2009). The interpretation of the collected assessment information informs students on how to extend their understanding and, at the same time, equips teachers with data to their instruction to the needs of their students.

In order to integrate monitoring and scaffolding activities into ongoing classroom practice, a number of applications have been underscored. In terms of monitoring, descriptive feedback supports students in extending their understanding of where they are in their learning process in relation to the goals they are aiming for (Sadler, 1998). Also, instructional activities should accommodate students with occasions to develop their self-assessment skills allowing them to employ these skills to generate feedback on their own learning in order to improve their learning (Black & Wiliam, 1998a; Sadler, 1989). Information derived from monitoring activities should result in scaffolding activities that support students in knowing what the next step in their learning process is (Wiliam, 2011). In terms of scaffolding, self-assessment is only possible when clear learning goals and criteria for work are discussed with students (Stiggins, 2005). Moreover, descriptive feedback should not only extend students' understanding of where they are in their learning process, it should also entail clear guidelines on how learning can be improved in order to meet standards (Sadler, 1998).

AfL and portfolio use

The term AfL is often used as a synonym of formative assessment. While not entirely synonymous (Stiggins, 2002), these terms are often used as such as AfL is an approach using formative assessment. A variety of modes of assessment that support the integration of AfL or formative assessment in classrooms have been discussed (Allal, 2010) and portfolio assessment is frequently mentioned in this respect (Birenbaum,

2003; Birenbaum et al., 2006; Black & Wiliam, 1998a; Davies & LeMahieu, 2003; Klenowski, Askew & Carnell, 2006; Stiggins, 2009; Tillema 2001). Pivotal in portfolio assessment is the central role that students play in this process (Allal, 2010, 2016). They need to seek feedback on their work and are required to make choices with respect to the work they want to compile as evidence for their learning (Tillema, 2001). Although it is emphasized that the power of portfolios lies in the formative use of the tool (Black & Wiliam, 1998a; Paulson et al., 1991) they can also be used summatively (Allal, 2010; Klenowski et al., 2006; Smith & Tillema, 2003). Portfolios supporting summative purposes are employed for accountability purposes, to evaluate knowledge or skills based on external standards (Van Tartwijk, Driessen, Van der Vleuten & Stokking, 2007). Portfolio use that serves formative purposes supports the integration of AfL in classroom practice. While both summative and formative purposes can occur together, several studies (Beausaert, Segers & Gijselaers, 2011; Tillema, 2001) have evidenced that portfolios serving predominantly formative purposes support learning more than portfolios that are predominantly used for summative purposes.

A central feature of portfolio use that supports AfL is the responsibility that students have in the assessment process (Paulson et al., 1991, Allal, 2016). Additionally, the tool requires students to reflect on their learning (Jarvinen & Kohonen, 1995). Critically evaluating work helps learners in identifying strengths and weaknesses and determining the gap between current performance and desired performance (Klenowski et al., 2006; Paulson et al., 1991). Next, the tool portfolio supports teachers in scaffolding student learning by providing information on the next step in students' learning (Tillema & Smith, 2000). In order to be effective as a scaffold, the feedback information should entail the standards students are working towards, a comparison between the current level of performance and these standards and

suggestions for improvement (Sadler, 1989). Based on the described literature we come to the following hypotheses regarding the relation between portfolio use and the characteristics of AfL:

Hypothesis 1a Portfolio use supports the AfL component monitoring.

Hypothesis 1b Portfolio use supports the AfL component scaffolding.

Motivational orientation: A Self-Determination Theory perspective

The literature on both AfL and portfolio assessment often assumes that this can enhance students' intrinsic motivation to learn (e.g. ARG, 2002; Chappuis & Stiggins, 2002). Motivation is also a key aspect of SRL as it is believed to promote, sustain and facilitate SRL (Pintrich, 2004). There is a vast amount of models of motivation that is relevant in studying the motivational component of SRL, however. Because the SDT offers an integrated view on self-regulation and motivation, thus in this study motivation is studied from this-perspective. Therefore, motivation is studied from a Self-Determination Theory (SDT) perspective (Deci & Ryan, 2000; Ryan & Deci, 2000) SDT distinguishes different types of motivational orientations based on different drives to engage in learning tasks. The most basic distinction is the difference between intrinsic and extrinsic motivation. Intrinsic motivation refers to the tendency to engage in activities because they are inherently interesting or enjoyable (Ryan & Deci, 2000). From a SDT perspective, an important educational goal is to promote students' intrinsic interest in learning (Deci, Vallerand, Pelletier & Ryan, 1991). When students are intrinsically motivated, their behavior is self-determined, they engage in activities freely and of their own volition. Consequently, intrinsically motivated behavior is regulated by choice. However, when students are extrinsically motivated, they engage in activities to avoid certain consequences or to obtain an external goal or reward. Their behavior, although motivated, is controlled. The locus of control is external to the self, indicating

that the regulatory process is compliance (Deci & Ryan, 2000). Within SDT, extrinsic motivation is not merely seen as the opposite of intrinsic motivation. Rather, different types of extrinsic motivation have been identified based on the extent to which they have been internalized (Deci & Ryan, 2000). The process of internalization refers to adapting socially imposed values into personally adopted values. It is considered a motivated process and results in students becoming self-determined in enacting formerly externally imposed values that are indispensable for effective functioning. Based on the extent to which motivation has been internalized two main categories are distinguished, namely controlled and autonomous motivation (Deci et al., 1991; Deci & Ryan, 2000).

Controlled motivation comprises the types of extrinsic motivation that are imposed by external regulation as a consequence of the absence of internalization (Deci & Ryan, 2000). External regulation can be considered the classic case of extrinsic motivation (Fortier, Vallerand & Guay, 1995). For example, students motivate themselves to engage in schoolwork because their teacher or their parents oblige them to do so. Introjected regulation refers to the situation when a person has partially internalized, but not accepted, certain demands or rules. This entails students motivating themselves to do their schoolwork because they would feel guilty if they wouldn't do their best or because they want to receive the approval of others (Deci & Ryan, 2000).

Autonomous motivation refers both to intrinsic motivation and to the internalized forms of extrinsic motivation; identified and integrated regulation (Deci & Ryan, 2000). In the case of identified regulation a person accepts and acknowledges the importance of a certain behaviour and has adopted the associated regulatory processes (Ryan & Deci, 2000). In an educational context this means that students endorse the value of learning and do their best at school because they find it useful or they think it is

important for their future. Finally, integrated regulation occurs when a person identifies with the importance of certain behaviour, but has also integrated this with other aspects of the self. Behaviour of the person is a reflection of what is valued by this person, thus this is fully self-determined. Students with integrated regulation styles do their best for school because they find it interesting or because they like doing it (Deci & Ryan, 2000). However, it is argued that integrated regulation is unlikely to be achieved during childhood years (Deci et al., 1991). Hence, this regulatory style is substituted for intrinsic regulation in research on the regulatory style of young children since integrated regulation and intrinsic regulation bear considerable similarities (Ryan & Connell, 1989).

Research from an SDT perspective has produced an extensive amount of studies evidencing the beneficial outcomes of autonomous motivation when compared to controlled motivation. For example, students who are intrinsically motivated achieve better learning outcomes (Fortier et al., 1995; Guay, Ratelle & Chanal, 2008; Pintrich & De Groot, 1990), make more use of deep level learning strategies (Vansteenkiste, Simons, Lens, Sheldon & Deci, 2004), show higher levels of persistence (Vansteenkiste et al., 2004) and psychological well-being (Miquelon & Vallerand, 2008). SDT scholars advocate that social and contextual factors are crucial in supporting or thwarting autonomous motivation (Ryan & Deci, 2000; Deci et al., 1991). Therefore unravelling classroom conditions, such as assessment practices, can increase our understanding of mechanisms responsible for promoting intrinsic motivation.

The relation between portfolio use and motivation

Many scholars emphasized that portfolios have the potential to enhance motivation (e.g., Clark et al., 2001; Danielson & Abrutyn, 1997; Hebert, 2001). Portfolios are to

promote motivation through empowering learners to take responsibility for their own learning (Hebert, 2001). Compiling a portfolio requires that students take ownership of their own learning. It involves evaluating work, internalizing criteria for good work and setting learning goals accordingly. These processes operate as motivating factors to take the next step in learning (Clark et al., 2001).

A small body of empirical research underlines the power of portfolios as a motivational strategy. Underwood (1998) found that in addition to improved reading achievement, middle school students using a portfolio reported a higher learning orientation compared to students not using a portfolio. Similarly, Moening and Bhavnagri (1996) concluded that portfolios as instructional tools increased elementary students' motivation to write. Portfolios supported students to identify characteristics of high quality and low quality writing and to use these criteria in evaluating their own work. Clark and colleagues (2001) explored how portfolios enabled 9th to 12th grade students' motivation for literacy learning. The data showed that portfolios as a record of achievement triggered students to reflect on their growth, set goals and engage in social interactions with peers when talking about their work. Tiwari and Tang (2003) studied nursing students using a course-related portfolio and indicated that they were more deeply involved with the tasks and showed more interest in learning, this was especially the case with students who lacked interest in learning. Gencel (2017) found that the use of portfolio's as assessment tool for student teachers, developed motivation and positive attitudes towards learning. In sum, the available studies indicate that there is a relation between portfolio assessment and student motivation, therefore, the following hypothesis is formulated.

Hypothesis 2 Portfolio use has a positive relation with students' autonomous motivation (identified regulation and intrinsic regulation).

AfL to enhance student motivation

Even though only a few studies unearth the impact of portfolio use on motivation, literature on the importance of AfL in enhancing motivation provides us with an understanding of this relation as portfolios are promoted to be used as tool for AfL. Carefully monitoring student progress generates information that allows for differentiation. When teachers use this information in planning instructional activities they aim to align learning with where students are and where they need to go and allow them to maintain their motivation (Cauley & McMillan, 2010; Nolen, 2011). Similarly, ceding responsibility to learners through monitoring their own learning (Allal, 2016) gives them insight in their progress towards learning goals and can be a drive for learners to continue pursuing their goals (Sluijsmans, Dochy & Moerkerke, 1999). Students will continue investing effort in their learning when they believe that learning goals are within their reach. Student motivation can therefore be supported by teachers by scaffolding student learning and providing challenging, but achievable next steps (Nolen, 2011; Shepard, 2005).

The available empirical research on the relation between AfL and motivation has resulted in inconclusive findings. Pat-El, Tillema and Van Koppen (2012) found effects of formative feedback on the intrinsic motivation of students in secondary vocational education. This effect was mediated by basic psychological need satisfaction. This is in line with research that suggests that students take more responsibility for their learning when formative assessment strategies are used by their teachers. Kirton and colleagues (2007) asked elementary school teachers to rate the perceived effects of formative assessment strategies, such as self- and peer assessment and higher order questioning. Teachers reported an increased intrinsic motivation in elementary school students, especially low attaining students were more motivated to engage in tasks. Moreover,

students were encouraged to develop a mastery orientation. This is in line with Meusen, Joosten, & Boshuizen (2016), who found effects of the use of formative assessment on the development self-regulation among students in sixth grade with writing tasks and an increase of intrinsic motivation for the learning tasks at hand.

However, not all studies found evidence that confirms the relationship between AfL and motivation. Yin et al. (2008) found that middle school students in classrooms where formative assessment was embedded in the science curriculum did not show a significantly higher motivation compared to students in the control group. According to the autors, an explanation for this finding may be found in the implementation of AfL practices. Some teachers in the experimental group did not implement the AfL practices as intended, while a number of teachers in the control group did so without being instructed. Based on the arguments outlined by scholars in the field of AfL the following hypotheses are investigated:

Hypothesis 3a There is a positive relation between monitoring and autonomous motivation (identified regulation and intrinsic regulation).

Hypothesis 3b There is a positive relation between scaffolding and autonomous motivation (identified regulation and intrinsic regulation).

Often, a direct relation between portfolio use and student motivation is assumed. In this respect, the effect of the tool has been emphasized without giving much consideration to the processes underlying the use of the tool. However, it is the process of constructing a portfolio that contributes to creating knowledge about learning (Tillema, 1998) and it is the process approach that is a critical success factor for the beneficial impact on students' motivation (Clark et al., 2001). In particular, the portfolio

process supports AfL characteristics; monitoring growth and providing scaffolds that help students to take the next step in their learning.

Hypothesis 4 Monitoring and scaffolding partially mediate the relation between portfolio use and students' motivational orientation.

The current study

Even though the arguments in the literature appear convincing, there is hardly any empirical evidence demonstrating the relation between portfolio use and AfL on the one hand and student motivation on the other hand. The available empirical studies suggest that Afl and SRL can have a beneficial impact on motivation. However, these studies are often conducted in an experimental setting in relation to specific subject areas, and are not conducted in elementary education. We have to conclude that despite the optimistic claims about the potential effects, there is thin empirical evidence. Therefore, the current study attempts to fill this gap and extend the knowledge of the relation between motivation as a key component of SRL and the use of portfolios as a tool for AfL in authentic classroom situations. More specifically, we investigate whether the tool portfolio predicts students' autonomous motivation for learning and whether a relationship can be ascribed in which the tool is used to support the integration of AfL in classrooms.

Method

Sample

Students from grade four to six (9- to 12-year-olds) from seven elementary schools

across the Netherlands participated in this study. Participating schools were selected at a network meeting where the research project of which the study presented here is part was introduced. This project comprised a research and development trajectory that aimed to develop students SRL by means of portfolio assessment as a tool for Afl. Five schools were willing to participate and used portfolios in their classroom practice; these schools constituted the experimental group (n students = 419). These schools used portfolio assessment to support students in monitoring their own development by selecting work for their portfolio. Reflection tags that stimulated students to reflect on both the strengths and weaknesses of their learning products and their learning processes were added to the portfolio. Furthermore, in reflective dialogues student and teacher discussed student learning using the portfolio as a source of evidence. Portfolios were not used for summative purposes by the participating schools.

In order to investigate whether there is a relation between portfolio use and students' motivational orientation, a control group was needed. Two schools constituted the control group (n students = 117), these schools attended the introductory network meeting, but did not use portfolios.

Questionnaires were administered in a total of 26 classes (see Table 1). The total sample consisted of 419 students, of which 201 (48%) were girls and 218 (52%) were boys.

[Insert Table 1 around here]

Procedure

Questionnaires were sent to the schools and were completed by students a couple of weeks after the start of the school year. Schools were free to decide when, and in which

order, students completed the questionnaires within a determined period of six weeks. Students filled out the paper-and-pencil questionnaires during school hours. All schools were assured that students' answers to the questionnaires were treated anonymously.

Measures

The different variables in the model were measured with questionnaires. The focus of the questionnaires was measuring students' perceptions of AfL and their motivational orientation as Entwistle (1991) emphasized that rather than the learning environment itself, students' perceptions of the learning environment influence students' learning and study behaviour.

In order to measure students' perceptions of AfL practices the Student Assessment for Learning Questionnaire (SAFL-Q) (Pat-El et al., 2013) was used. The items were scored on a 5-point Likert scale, ranging from 'never' to 'always'. The original Dutch version of the questionnaire that was used consists of 28 items measuring the extent to which students perceive monitoring (16 items) and scaffolding (12 items) as integrated in their classroom practice.

To gauge students' motivational orientation, four scales of the Children's Perceived Use of Self-Regulated Learning Inventory (CP-SRLI) (Vandevelde, Van Keer & Rosseel, 2013) were used, measuring three types of extrinsic motivation, viz. extrinsic regulation (3 items), introjected regulation (4 items) and identified regulation (4 items), as well as intrinsic regulation (3 items). All 14 items were scored on a 5-point Likert scale, ranging from 'strongly disagree' to 'strongly agree'. Additionally, the questionnaire asked students to fill out a number of background variables (school, grade and gender) that could have an effect on motivation.

Data-analysis

The relations among the variables in the proposed model were investigated through structural equation modelling, using EQS 6.1 (Bentler, 1989). The analysis comprised confirmatory factor analyses and structural equation modelling. Firstly, the measurement model was assessed in two steps. In the first step, the latent constructs of the two questionnaires used were assessed using confirmatory factor analysis for each questionnaire separately. Model respecifications were based on low factor loadings of items, the number of crossloadings of items and modification indexes. Since the data were multivariate non-normally distributed, the Satorra-Bentler scaled statistic ($\Delta S\text{-}B\chi^2$) and robust standard errors were evaluated. In order to assess model fit, various fit indexes were taken into account. An adequate fit of the model is indicated by a value of the Comparative Fit Index (CFI) greater than .90 (Bentler, 1992). Furthermore, a value of the Root Mean Square Error of Approximation (RMSEA) lower than .06 reflects a good model fit (Hu & Bentler, 1999). Following the evaluation of the fit of each of the two separate measurement models, the fit of a full measurement model that included all the latent constructs (monitoring, scaffolding, extrinsic regulation, introjected regulation, identified regulation and intrinsic regulation) was assessed in the second step of the measurement model development.

Secondly, after confirmation of the measurement model, the structural model was specified. In a first step, a model was tested to examine the direct effect of portfolio use on motivational orientation. In a second step, an alternative model was tested in which the effect of portfolio use was mediated by AfL. To evaluate whether the initial model fitted the data significantly better than the alternative model, nested models were compared using the Satorra-Bentler scaled chi-square difference test ($\Delta S\text{-}B\chi^2$; Satorra & Bentler, 2001).

Additionally, two control variables were added to the structural models in order to avoid confounding with the variables under study. We controlled for gender since previous research has shown that boys and girls vary in their motivational orientation (e.g. Meece, Bower Glienke & Burg, 2006). Furthermore, we controlled for grade as a proxy measure for age, as several studies have indicated that motivation changes as students progress in their education (e.g. Lepper, Corpus & Iyengar, 2005).

Results

Measurement model development

This study expands on the construct validity of the SAFL-Q (Pat-El et al., 2013) and the CP-SRLI (Vandevelde et al., 2013). Since these measures were not used in the context of Dutch elementary education before, the validity of the robustness of the factor structure was tested by performing confirmatory factor analysis (CFA) on the original questionnaires. The CFA of the original SAFL-Q showed a moderate fit: SB-χ^2 = 830.926; df = 349; $p < .001$; CFI = .833; RMSEA = .052 (.047, .057). Six poorly fitting items were identified because of high error variance and cross loadings. Two of these items belonged to the monitoring scale and four to the scaffolding scale. The poorly fitting items were analysed and eliminated from the model as elimination of the items was not associated with a loss of concepts measured by the questionnaire. Furthermore, correlation was allowed between the residuals of five item pairs that represented similar content and belonged to the same scale. The modifications resulted in a good fit to the data: SB-χ^2 = 289.697; df = 203; $p < .001$; CFI = .963; RMSEA = .029 (021, .036).

Next, we constructed the measurement model for the original scales of the CP-SRLI. The fit indices indicated a moderate fit: SB-χ^2 = 328.594; df = 71; $p < .001$; CFI = .910; RMSEA = .065 (056, .075). Two items were deleted, because of high error

variance, one item from the introjected regulation scale and one from the intrinsic regulation scale. Excluding these items from subsequent analyses did not cause a substantial loss of information. This resulted in good model fit: SB-χ^2 = 87.214; df = 48; p < .001; CFI = .974; RMSEA = .040 (026, .053).

Full measurement model

The full measurement model that comprised all the latent constructs from the two tested measurement models showed an excellent fit to the observed data: SB-χ^2 = 645.396; df = 507; p < .001; CFI = .965; RMSEA = .024 (018, .029). Table 2 gives an overview of the final scales used, along with the Cronbach's alphas and example items. Means, standard deviations and correlations between the factor scores are presented in Table 3.

[Insert Table 2 around here]

[Insert Table 3 around here]

Structural model

After confirming the full measurement model the structural model was tested. We controlled for gender and grade by adding direct effects of the control variables on the outcome variable, students' motivational orientation. Model 1, in which the direct effect of portfolio use on students' motivational orientation was tested, had reasonable good fit indices: SB-χ^2 = 1043.199; df = 631; p < .001; CFI = .907; RMSEA = .037 (.033, .040). Additionally we tested an alternative model, Model 2, in which the relation between portfolio use and students' motivational orientation was fully mediated by the AfL characteristics monitoring and scaffolding. In this model, the CFI and RMSEA remained unchanged. However, the SB-χ^2 slightly increased in Model 2: SB-χ^2 =

1050.492; df = 635; p < .001; CFI = .907; RMSEA = .037 (.033, .041). The degradation in SB-χ^2 is expected with the removal of parameters from the model. The difference in SB-χ^2 between the two tested models was not significant: Δ SB-χ^2 (4) = 7.52, p >.05. The findings argue for retaining the more restrictive Model 2. Standardized regression coefficients of Model 2 are presented in Figure 1.

[Insert Figure 1 around here]

Evaluation of the final structural Model 2 shows that portfolio use does not significantly support monitoring activities (Hypothesis 1a). In contrast to the expectations a negative relation was found (β = -.14) between portfolio use and scaffolding (Hypothesis 1b). This implies that students who use a portfolio perceive scaffolding activities as less integrated in their classroom practice compared to students who do not use a portfolio. Portfolio use did not have a direct relation with students' motivational orientation (Hypothesis 2). Also, no significant relation was found between monitoring activities and students' motivational orientation (Hypothesis 3a). However, scaffolding was found to predict students' autonomous motivation positively (Hypothesis 3b). More specifically, the findings show that scaffolding activities in the classroom relate to identified regulation (β = .47) more than to intrinsic regulation (β = .36). No significant paths were found for scaffolding on extrinsic regulation and introjected regulation. The results show that the relation between portfolio use and motivation was not partially mediated by monitoring and scaffolding, but fully mediated (Hypothesis 4). The background variables, gender and grade, which were added to the model, played a significant role in explaining students' motivational orientation. Girls were less extrinsically motivated (β = .12) and more intrinsically motivated than boys (β

= -.14). Also, older students were in general less motivated than younger students, both extrinsically as intrinsically. With respect to extrinsic regulation students in grade 4 were more extrinsically motivated than students in grade 5 (β = -.10) and grade 6 (β = -.10). For intrinsic motivation, grade 4 students were more intrinsically motivated than grade 5 students (β = -.28) and grade 6 students (β = -.33).

Conclusion

The aim of Afl and SRL to empower students to become active agents in their learning process is widely discussed, in research as well as in practice. In order to become active agents in their learning process, it does not suffice to have the necessary (meta)cognitive strategies, students must also be motivated to apply these strategies throughout the execution of the learning tasks. In this respect portfolio assessment as a tool to integrate Afl in ongoing classroom practice is often advocated. Although the assumption that both portfolio use and AfL enhance student motivation for learning is widely accepted, surprisingly little empirical evidence is available to support this assumption, especially for students in elementary education. This study was conducted to obtain an understanding of the relation between portfolios as a tool for AfL and students' motivational orientation. Using structural equation modelling we tested a model that took into account gender and grade. The latter as a proxy measure for age. We conjectured that the relation between portfolio use and students' motivation was partially mediated by AfL. However, our results show that the relation between AfL and student motivation is not as straightforward as is often assumed. Firstly, it revealed that portfolio use does not predict students' motivational orientation directly. The influence of portfolios on students' motivation was found to be fully mediated by students' perceptions of AfL. In other words, this finding suggests that merely implementing the tool portfolio does not guarantee an increase in students' motivation. Moreover,

portfolio use did not support the integration of monitoring activities in the classroom. Contrary to our hypothesis, portfolio use was related to lower student perceptions of scaffolding activities as part of classroom practice.

With respect to the influence of AfL on students' motivational orientation for learning the results show that giving students insight in their learning progress and their strengths and weaknesses (monitoring) does not significantly relate to controlled motivation nor autonomous motivation. In addition, providing information that supports students in taking the next step in their learning (scaffolding) was not related to controlled motivation. However, scaffolding did relate positively to autonomous motivation. The main conclusion that can be derived from these data is that students who use a portfolio perceive less scaffolding compared to students not using a portfolio, but scaffolding positively predicts autonomous motivation. Consequently, students who use a portfolio are less autonomously motivated than students who do not use a portfolio. This detrimental relation is quite remarkable in the light of the numerous studies that have hypothesized the beneficial impact of portfolios in promoting students' motivation.

The influence of the control variables in our model supports findings from previous studies. With regard to gender differences, boys were found to be more extrinsically motivated and less intrinsically motivated than girls. This converges with studies that have shown that girls report higher levels of intrinsic motivation (Meece & Holt, 1993) while boys report more extrinsic motivation (Patrick, Ryan & Pintrich, 1999). Furthermore, a decrease in motivation was found as students' progress in schooling, a finding that supports the conclusions of previous research (e.g. Bouffard, Marcoux, Vezeau & Bordeleau, 2003; Lüftenegger et al., 2012).

The tool portfolio was not related to enhanced student motivation in our study. However, the results do not disconfirm the effectiveness of portfolios in promoting students' motivation. Students who used a portfolio perceived less scaffolding activities than students who did not use a portfolio. This may indicate that portfolios are not optimally used to integrate AfL in instructional activities at the participating schools. Difficulties with implementing AfL in schools is found in other research (Wylie & Lyon, 2015). As a consequence a reason for the lower student perceptions of AfL in the experimental classrooms may lie in teachers' perceptions of their assessment practice (Heitink, Van der Kleij, Veldkamp, Schildkamp & Kippers, 2016) and the role they should play (Allal, 2016) as well as their ability and skills to integrate AfL in daily classroom practice (Braund & DeLuca, 2018) Because teachers in the experimental condition have a tool for integrating scaffolding they may not feel the need to create more scaffolding opportunities in their classrooms. As such, scaffolding activities may be restricted to portfolio practice and therefore rather separated from other teaching and learning activities. Researched evidenced that alignment of assessment and AfL practices in the classroom is needed for having effect from AfL on student learning. Our results show that students in the control condition might have perceived more scaffolding. Perhaps more integration took place, as teachers in the control condition did not have a tool at their disposal to support this. As a result of this, these teachers may feel the need to continuously integrate scaffolding activities in their classroom, leading to more co-regulation with regard to student learning, a condition according to some scholars (see for instance Allal, 2016) for implementing self-assessment as a formative assessment tool that benefits students learning. Yin and colleagues (2008) put forward a similar argument for explaining the absence of a significant effect of embedded formative assessment on students' motivation. Not all teachers in the

experimental condition implemented strategies as designed, while a number of teachers in the control condition used formative strategies spontaneously. Whether the perceptions of the teachers in this research match actual assessment practice needs to be investigated in future research.

The remarkable finding that portfolio use is detrimental for students' motivation may be explained by the perceptions of students. Perceptions of students is found to be an influencing factor (Heitink, Van der Kleij, Veldkamp, Schildkamp & Kippers, 2016), meaning that a positive attitude towards AfL leads to more positive emotions and to more learning outcomes. However in this research, the perception of the tool as a collection of end products, produced by students, rather than an aid offering them guidelines to improve their learning could lead to less motivation. Consequently, the few available scaffolds the portfolio offers can cause confusion and therefore thwart their motivation to learn. The emphasis on the portfolio as a process, in which learning is carefully monitored, but also accommodated with guidelines to improve learning, is crucial in the connection between the tool and students' motivation (Clark et al., 2001). The findings presented here indicate that modes of assessment that trigger monitoring and scaffolding are more important than the tool portfolio itself. Previous research (e.g. Katz, Eilot & Nevo, 2014; Liang, Hsu & Chang, 2013) has shown that motivation mediates various learning behaviours and outcomes. However, in this study, learning outcomes were not the focus of investigation. A direction for future research would be to investigate the relation between portfolio use and learning outcomes and whether this relation is mediated by perceptions of AfL.

Some remarks should be made about the limitations of this study. First, our conclusions are limited to correlational inferences. Longitudinal research can shed more light on the causal relations between the variables under study.

Second, a relative small number of schools participated in this study. Due to the small sample of schools it was not possible to gain understanding of school effects by conducting multigroup structural equation modelling. There is a need for replicating this study with a larger sample to gain a deeper understanding in the conditions that support or thwart the impact of portfolio assessment on students' motivation and learning.

Third, a self-report measure was used to gauge the extent to which students perceived AfL as part of their classroom activities. In order to fill out this questionnaire students were required to reflect on a wide range of assessment related activities. Given the age of the students that participated in this study, reflecting on AfL practices as they were operationalized in the questionnaire might be complex for them. Future research should build on the current results that students' perceptions of AfL are related to motivation and explore possibilities for using a combination of data sources, such as teacher reports and video observations, in order to determine more objectively the extent to which classrooms can be characterized as high in AfL practice. This will increase our understanding of the relation between AfL and motivation in this specific educational context.

A fourth limitation of this study lies in the reliability of the scales used. The reliability of two of the scales (scaffolding and introjected regulation) can be considered moderate. This may have influenced our findings. The scales should be further developed and tested. Finally, the experimental schools in this study are embarking on a process of developing their portfolio practice in alignment with the principles of AfL. Consequently, the relations that were found in this study may only be an accurate reflection for this point in time. An emphasis on the integration of monitoring and scaffolding in portfolio practice by the participating schools may change the relations in the model and result in a positive impact on students' motivational orientation. Future

research should unravel whether embedding AfL as integral part of classroom activities results in changed relations in the model.

To conclude, despite some limitations, the presented model has relevant implications for practice. The literature on portfolio assessment assumes that involving students in their own assessment process has a beneficial impact on students' motivation as they develop a clearer understanding of their strengths and weaknesses and the next steps to be taken in their learning process. This study showed that the relation between these concepts is more nuanced and complicated, and that merely using portfolios does not warrant an increase in motivation. Rather, the way in which the tool is used to support assessment and learning is crucial. These results imply that teachers need to be cautioned that the tool should not merely be used to collect student work without accompanying this with an evaluation of the collected evidence in terms of where students are in their learning process and what their next step is. Furthermore, monitoring and scaffolding activities should not only be restricted to portfolio assessment. Integrating these assessment practices into a broad spectrum of instructional activities increases students' understanding of how they can assess their own learning and how the derived information can be used to enhance their learning.

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